

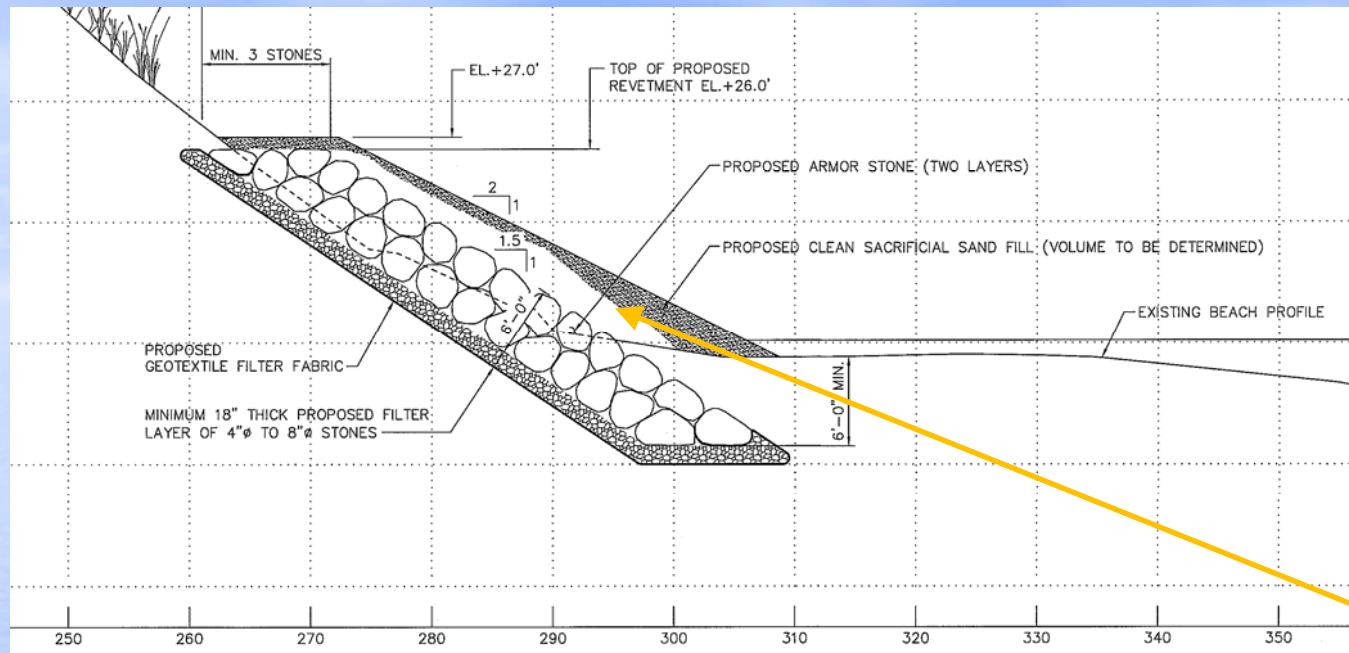
Baxter Road and Sconset Bluff Storm Damage Prevention Project

Nantucket, Massachusetts

Siasconset Beach Preservation Fund

Conservation Commission Hearing
8/8/13

Initial Sand Mitigation

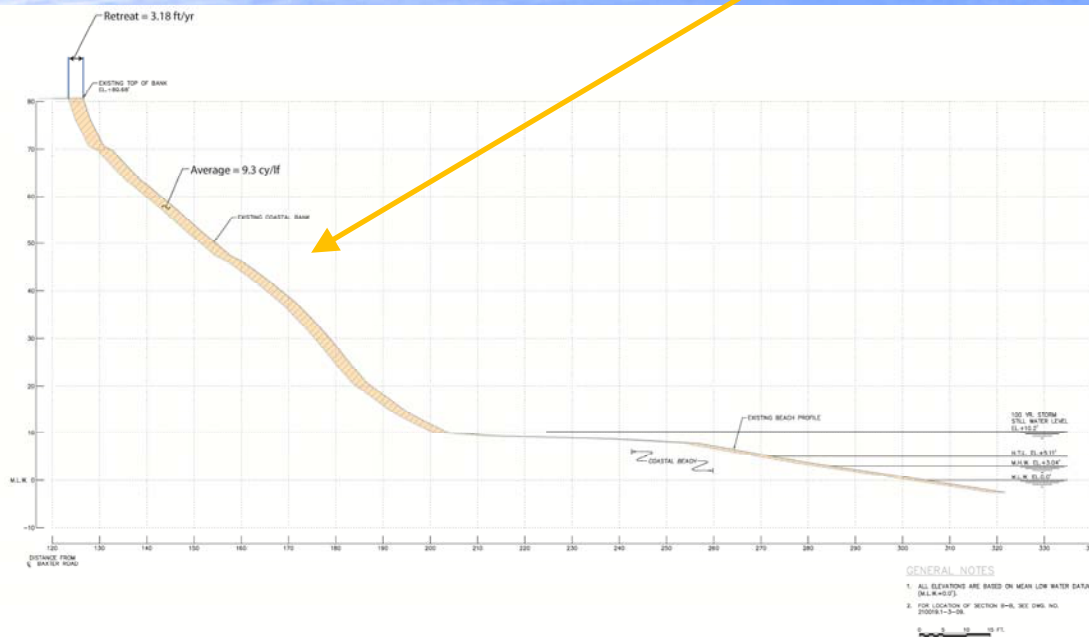


- **NOI Engineering Plans** included an initial veneer of sand on the surface of the revetment.
- **NOI text** in section 3.2.2 indicates that sand is typically not placed on the face of revetments, but may be included for aesthetic purposes.
- We have decided that rather than placing the sand on the face of the revetment, we will place the sand mitigation both in front of and at the ends of the revetment. This revised approach will make the sand more available to adjacent beaches to mitigate the armoring of the coastal bank.
- Sand will be placed at the toe of the revetment in the form of a terrace or sacrificial dune and will extend approximately 300 feet at revetment ends to help prevent end scour.
- This sand mitigation will be added to the design plans which will be revised next week using recent LIDAR survey results.

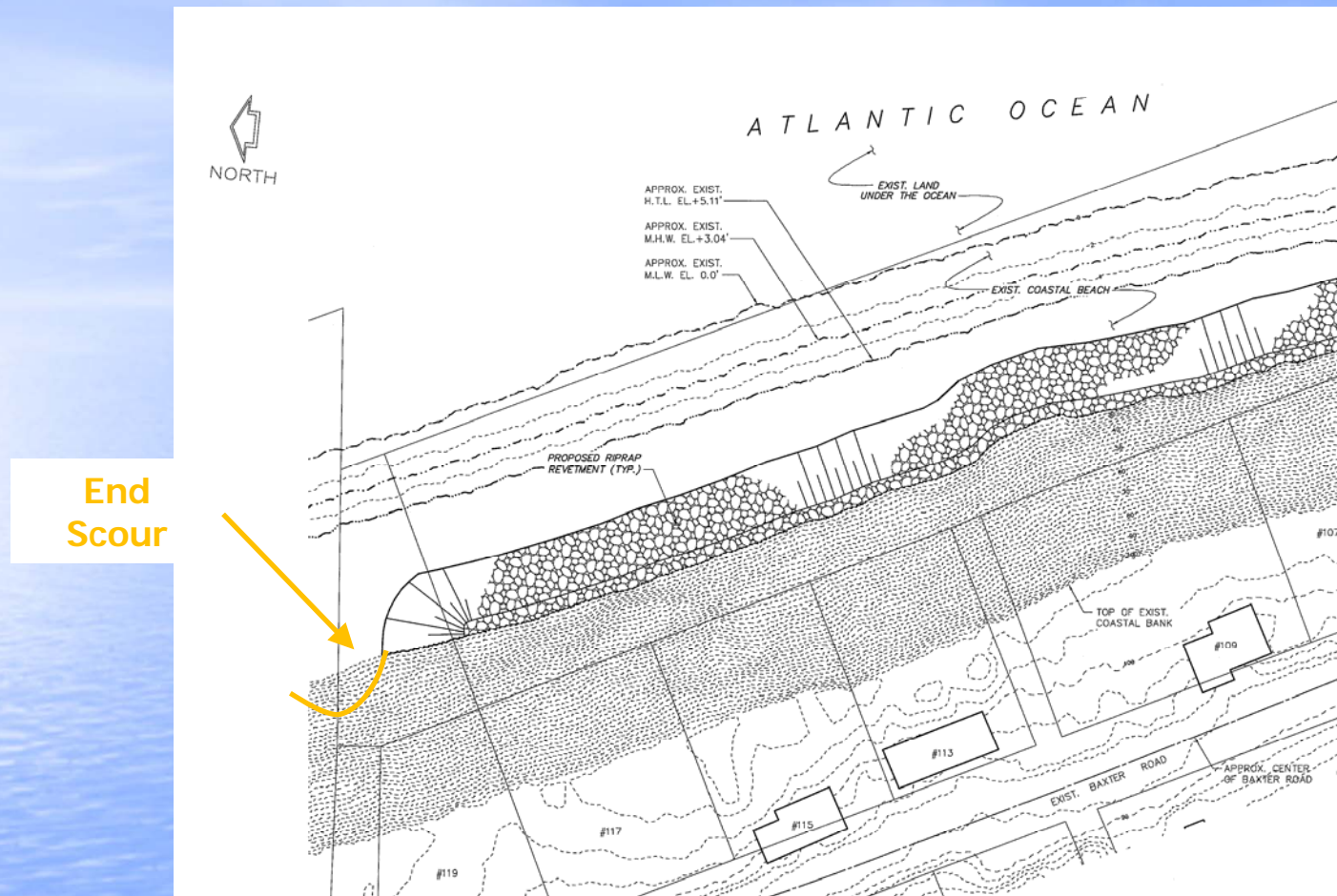
Sand Mitigation Calculation



- Determined based on coastal bank retreat rate, and
- Actual bank profiles.
- Will be updated to 2013 with new LIDAR results.
- This approach is “Best Available Measure” as practiced by DEP, CZM and most ConComs.



What if sand mitigation isn't sufficient and end scour occurs?



- SBPF will monitor areas immediately adjacent to the revetment after storms to determine if end scour is occurring.
- If end scour is occurring, additional sand mitigation will be provided to abate the situation.
- SBPF also will continue to monitor the extensive existing shoreline monitoring transects to determine if the project is causing impacts to downdrift beaches.
- If downdrift impacts are found the sand mitigation program will be adjusted.

Long term Funding of Mitigation?

- Funding of construction and the ongoing mitigation and maintenance commitment would be funded by the creation of a betterment district, i.e. assessments on the properties on both sides of Baxter Road fronted by the revetment.

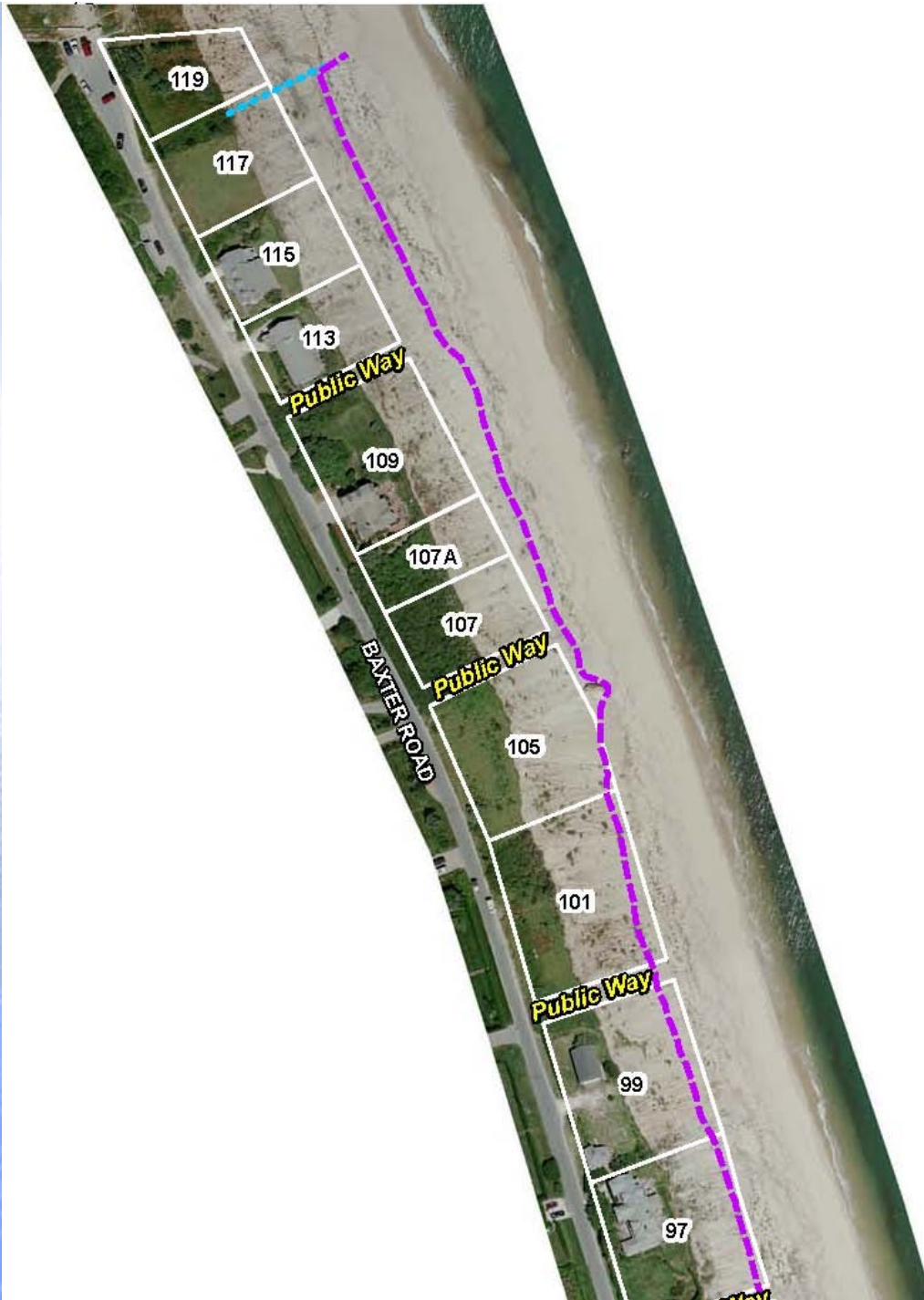
Inventory of Public Coastal Engineering Structures in Massachusetts

- At the last meeting we reviewed some of the results of the inventory of public coastal engineering structures in Massachusetts prepared by the Department of Conservation and Recreation, Division of Waterways.
- One of the Commissioners requested a copy of the inventory and we have sent Jeff Carlson a copy so it can be posted on your website.

Why not Retreat Alternative?



- As Sara Alger stated at the last meeting, retreat is usually treated as moving a house back on the same lot, not requiring the acquisition of additional land.
- The Town has conducted a preliminary evaluation of providing additional access to Baxter Road. This would involve the need for takings, large damage awards and substantial costs to relocate the road and utilities, if this is even feasible.
- The Town is not planning for alternative access at the moment. The Town has entered into a MOU allowing the SBPF to try to protect the road.
- SBPF has agreed to use its best efforts to design and arrange for approval of this protection.



Public Access

LEGEND

- Phase 1
- Phase 2
- Existing Bluff Walk
- Existing Stairs
- Possible Future Stairs
- Walkway Across Revetment (Including Stairs)

Scale 1:3,600
1 inch = 300 feet



Basemap: 2011 Aerial Imagery, ESRI



Public Access

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1 inch = 300 feet

0 75 150 300
Feet



Basemap: 2011 Aerial Imagery, ESRI



Public Access

LEGEND

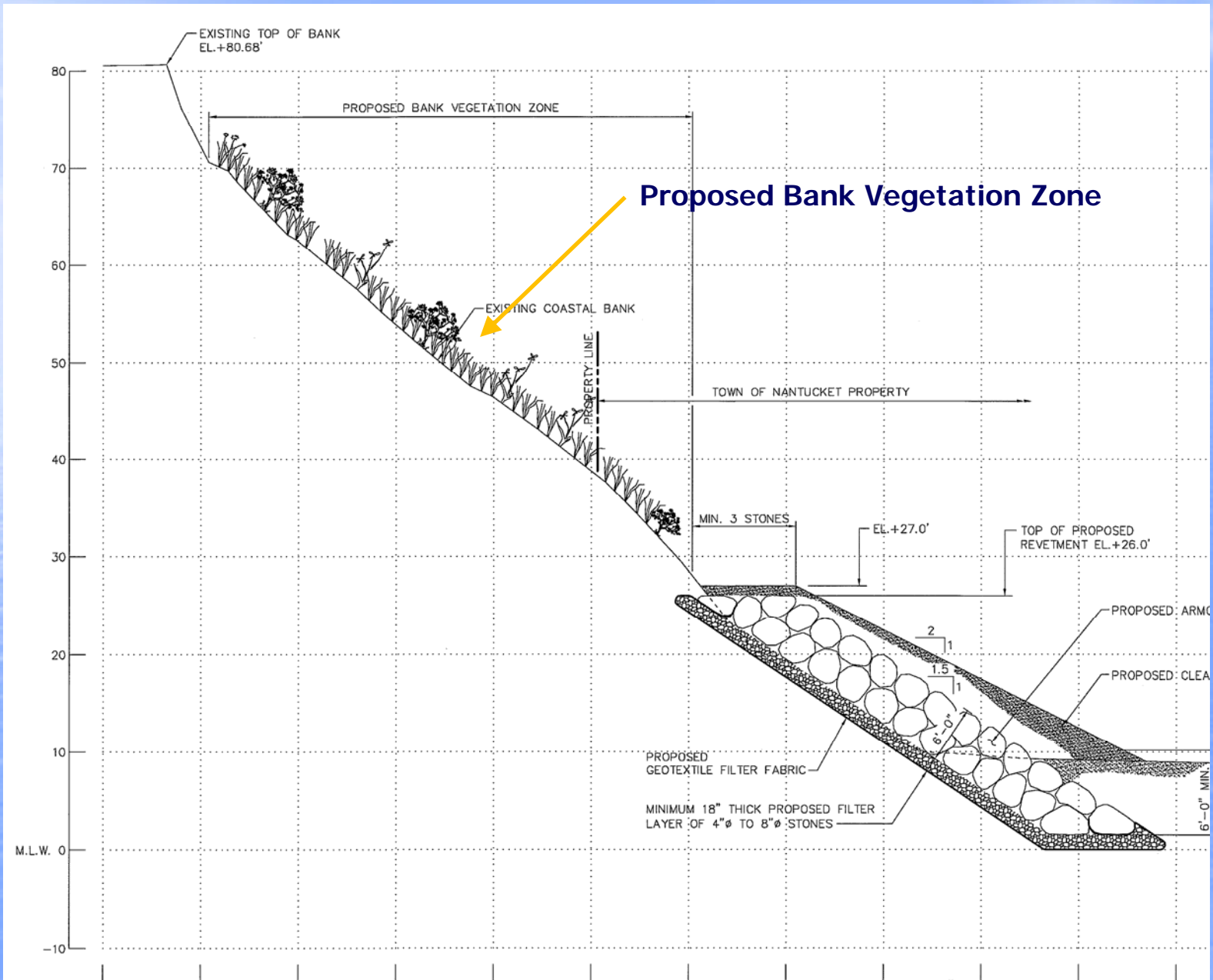
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Scale 1:3,600 0 75 150 300
 1 inch = 300 feet Feet



Basemap: 2011 Aerial Imagery, ESRI

Vegetation



Vegetation

Beachgrass will be planted first.

Woody vegetation will be planted after the bank surface is stabilized.



American Beachgrass
(*Ammophila*
breviligulata)



Bearberry
(*Arctostaphylos uva-ursi*)



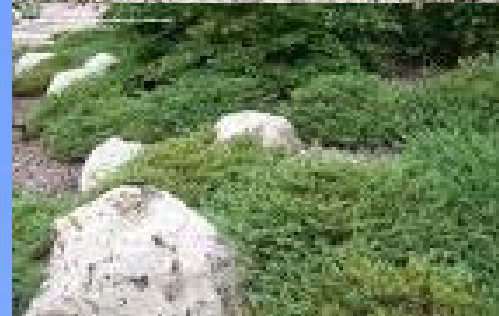
Beach Heather
(*Hudsonia tomentosa*)



Bayberry
(*Myrica pensylvanica*)



Beach Plum
(*Prunus maritima*)

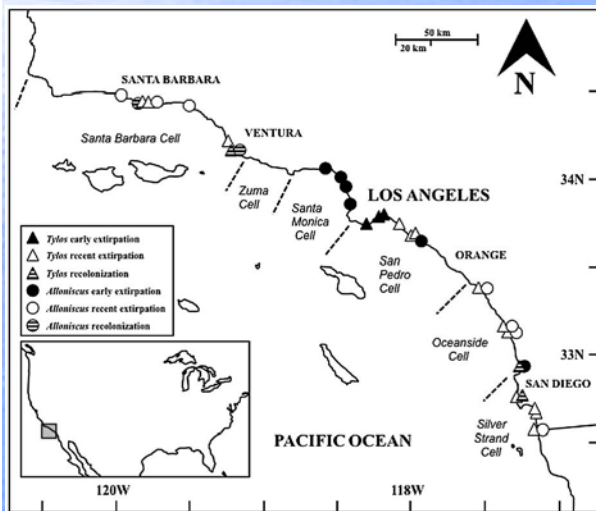


Creeping Juniper
(*Juniperus*
horizontalis)

Article on California Beach Fleas



- Sarah Oktay referred to an article that she added to the record entitled “Local extirpations and regional declines of endemic upper beach invertebrates in southern California” published in Estuarine, Coastal and Shelf Science (2013).
- This article focuses on two species of isopods (beach or sand fleas) that reside in the supratidal or high intertidal beach zones along the California coast.
- This particular study focused on their distribution between Santa Barbara and San Diego.
- The article indicates that various coastal urbanization activities have caused a reduction in numbers of these two species.
- Coastal urbanization includes activities such as large beach nourishment, river damming, beach grooming and coastal armoring that affects sediment supply to the beach.
- The armoring projects in the areas of this study typically do not include sand mitigation associated with them.
- Also, this section of the California coast is divided into cells by rivers, headlands, etc. and since the isopods can't swim, they are not able to easily get dispersed between cells.
- Sconset not comparable: Not heavily urbanized coast (LA, Long Beach, San Diego, etc.); No beach cells and sand mitigation associated with this project.



NLC Letter dated July 30, 2013

Need current plan based on existing conditions

- Stamped plans based on an updated LIDAR survey will be provided next week.
- Plans based on available 2010 LIDAR survey were used to develop the plan set for the NOI submission as these were the best available data in the context of the emergency declared by the Board of Selectmen and SBPF's obligation under the Memorandum of Understanding (MOU) between the BOS and SBPF which requires SBPF to use our best efforts to get a project approved and installed before the road is lost this winter.
- We had previously engaged an aerial photography company and local surveyor to conduct a new LIDAR survey with local control.
- SBPF is still very concerned about losing the window of opportunity to build the revetment this year to protect Baxter Road.

NLC Letter dated July 30, 2013 (cont.)

The project as proposed has not met the standards of the state Wetlands Protection Act...

- The Project's compliance with the state performance standards is described in detail in Section 4.0 of the Notice of Intent.

There are a number of performance standards under the local Bylaw and Regulations that have not been met and will require the justification of a waiver...

- A Waiver will be requested for that portion of the project that will include the toe of the revetment that is to be buried below the beach.

NLC Letter dated July 30, 2013 (cont.)

The proposed project is not water dependent under the local definition and will require waivers

- The local definition of Water Dependent Project or Uses is *"projects which require direct wetlands access for their intended use and therefore cannot be located out of the Area Subject to Protection Under the Bylaw..."*
- The revetment must be located on the coastal bank and coastal beach wetland resources for the intended use of providing storm damage prevention, thus it clearly meets the definition of a water dependent project.
- The Nantucket Conservation Commission on 11/14/12 issued an Order of Conditions approving a coastal engineering structure at 93 and 99 Eel Point Road (SE48-2479) and they made the Additional Finding 4 as follows: "The Commission finds that the project is a water dependent project as it requires direct wetlands access for its intended use and therefore cannot be located out of the Area Subject to Protection Under this Bylaw."

NLC Letter dated July 30, 2013 (cont.)

The loss of coastal beach resource area will result in adverse effects on wildlife, erosion control, storm damage prevention, and recreation

- The Project's compliance with this provision is set forth in Section 5.0 of the NOI.
- We review the lack of significant impacts on wildlife, erosion control, storm damage prevention, and recreation in the following submitted documents:
 - Sections 4.0 and 5.0 in the NOI
 - "Responses to Questions from the Nantucket Conservation Commission asked at Public Hearing on July 24, 2013"
 - Technical memo from Mike Ludwig dated January 23, 2012 and submitted to the Conservation Commission on July 24, 2013
 - Public Access Plan included in July 31, 2013 hearing presentation and updated in today's submission
- The above document that there will be no adverse impacts to wildlife, including mole crabs and sand fleas.
- Public access will be maintained or enhanced, through the provision of a walkway along the top of the revetment and additional stairs. The existing Sconset Foot-path will be protected.
- The project will benefit erosion control and storm damage prevention by protecting the bank while also providing annual sand mitigation.

NLC Letter dated July 30, 2013 (cont.)

Question about proposed nourishment schedule and volumes.

- Discussed later when we respond to the Applied Coastal memo.

Applicant has stated that project will result in the complete loss of a significant area of coastal beach resource area.

- We have stated that the project may result in some thinning of the coastal beach; however, sand mitigation will prevent the loss of most of the coastal beach resource area.

Applied Coastal Memo dated July 29, 2013

Sand Mitigation Approach and Calculation

- Using the bank erosion rate (not shoreline erosion rate) is the “Best Available Measure.” This standard has been consistently required by DEP, CZM, and many local Conservation Commissions.
- We will be recalculating long-term bank retreat with the new LIDAR data.

Need Current Plans

- Stamped plans based on an updated LIDAR survey will be provided next week.

Shoreline Monitoring Plan

- We have already stated that we would conduct additional monitoring both updrift and downdrift of the revetment and provide sand mitigation if end effects are documented.

Provide Additional Revetment Examples – Higher Wave Energy & Bank Retreat Similar to Sconset.



Revetments and Wave Energy

- Many revetments in Massachusetts are exposed to Northeaster storm waves and they have protected upland properties from storm damage.
- Northeasters tend to be the most severe coastal storms that we experience because they can last several days over numerous high tide cycles.

Revetments and Wave Energy

1,400 ft Long Montauk Point Revetment, NY



- **Similar Wave Energy to Sconset**
- **Similar bank composition of glacial sediments**

Revetments and Wave Energy

5,000 ft long Revetment at Oceanside, California



- Similar Wave Energy to Sconset
- Revetment has protected houses for last 30+ years.

Revetments and Wave Energy

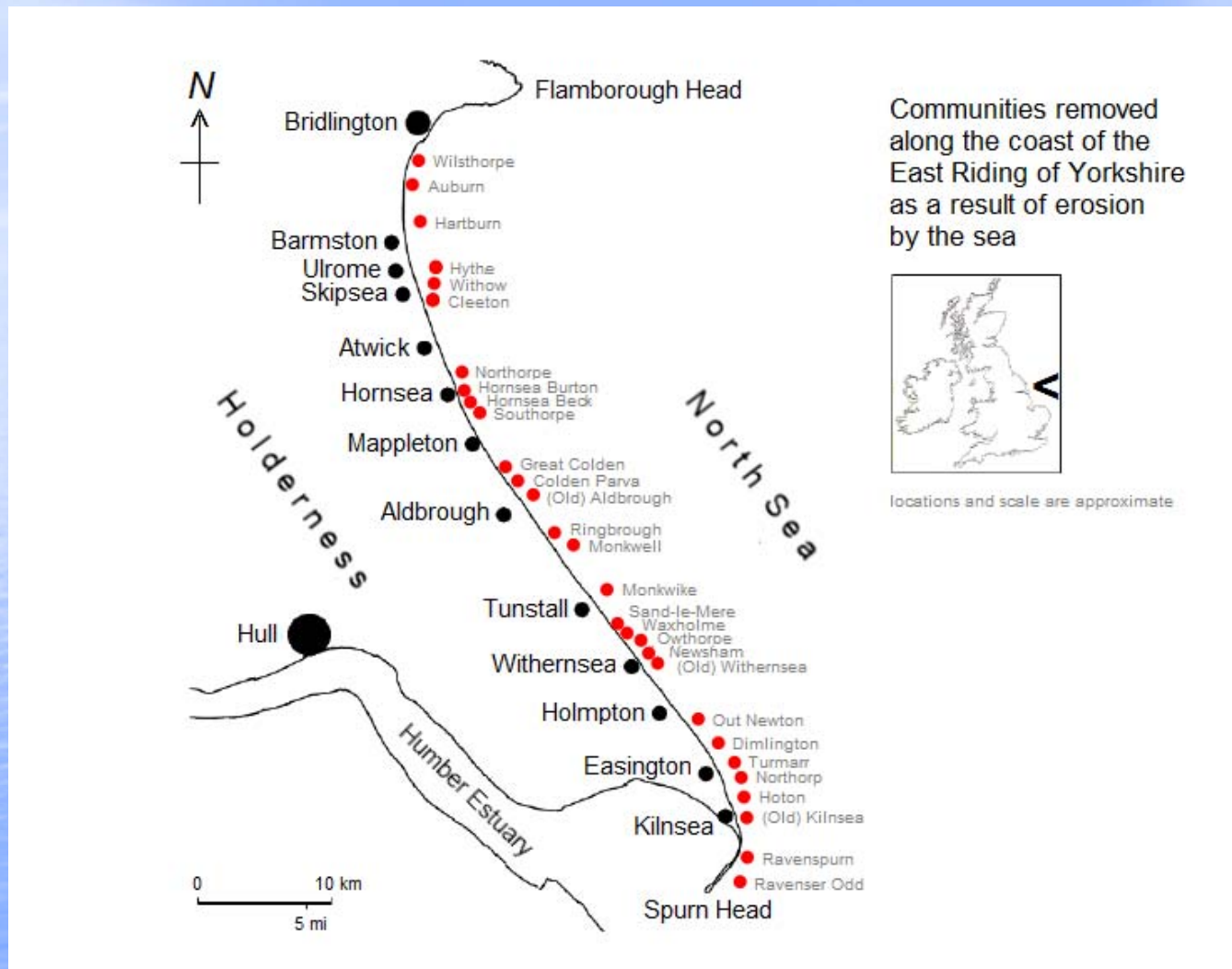
5,800 foot long Withernsea Revetment, Yorkshire, UK



- Similar Wave Energy to Sconset – faces North Sea
- Greater than 2 meters/year erosion rate > than Sconset

Revetments and Wave Energy

5,800 foot long Withernsea Revetment, Yorkshire, UK



- 30 Villages Lost Since Roman time along this Holderness shoreline

Revised Typical Section



OCEAN AND COASTAL
CONSULTANTS

PROJECT SCONSET REVEGETMENT DESIGN
SUBJECT REVISED TYPICAL SECTION
FOR 100-YEAR STORM DESIGN

SHEET NO. _____ **OF** _____
JOB NO. OCC 210019.1 **TASK NO.** 001
MADE BY BRJO
CHKD BY _____
DATE 7 AUGUST 2013

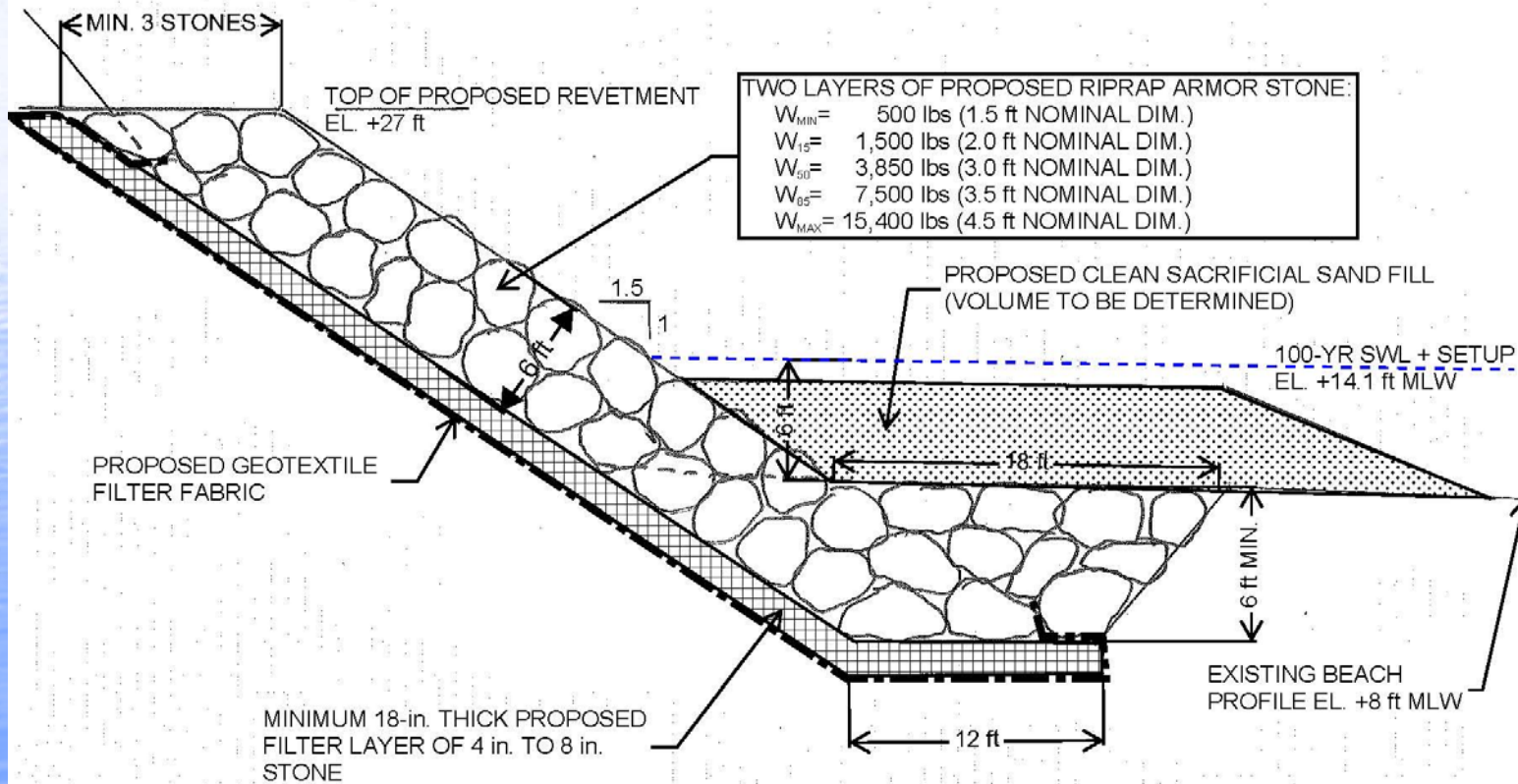
DESIGN INPUTS:

SWL_{100-YR} = EL. +10.2 ft MLW
SWL_{500-YR} = EL. +12.5 ft MLW
WAVE SETUP = 3.9 ft
MUDLINE = +8 ft MLW
WATER DEPTH AT STRUCTURE (d) = SWL + SETUP - MUDLINE

$H_{s100} = d * 0.78 = 6.1 \text{ ft} * 0.78 = 4.8 \text{ ft}$
 $H_{s500} = d * 0.78 = 8.4 \text{ ft} * 0.78 = 6.5 \text{ ft}$
THEREFORE, USE $H_s = 5.5 \text{ ft}$ FOR CONSERVATIVE DESIGN
 $T_p = 12.16 \text{ sec}$

CALCULATION OUTPUTS:

MAX. RUNUP = EL. +25 ft MLW
ARMOR SIZE (SEE BELOW)





The End